

COCKPIT AUTOMATION AND CREW COORDINATION

FINAL TECHNICAL REPORT

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I. PURPOSE

The purpose of this research was to investigate the interaction between humans and complex machines which operate essentially automatically, but must be programmed and monitored by humans. Specifically, the research focuses on the interaction of cockpit automation and cockpit resource management (CRM), or crew coordination. Our goal is to determine whether the degree of automation in the cockpit environment affects crew coordination, communication, and CRM. The results will have implications for both commercial aviation and space flight.

The method consisted primarily of experimental LOFT (line-oriented flight training) missions performed in the training center of a host airline.

II. CURRENT STATUS

At the end of this grant period, December 31, 1989, data had been collected from the host airline. This consisted of:

1. Questionnaire data
2. Flight simulation data.

The questionnaire data were entered into a statistical database, for analysis during the 1990 grant year. The simulation data are on video tapes, each representing on LOFT flight in one of two airline cockpits, the DC-9-30 (old technology) and MD-88 (modern technology). Analysis of these tapes require considerable time and expertise. The analysis will take place at Ames during 1990 and 1991.

III. PUBLICATIONS

The results of these studies will be published in 1991 in three volumes (see attached Gantt chart). A fourth volume, summarizing the first three, is also contemplated for 1991 publication.

The following publications were completed under this project, but do not report data from the primary experiment.

Wiener, E. L. (in press). Cockpit automation issues in CRM and LOFT. In S. Gregorich and T. Chidester (Eds.), Proceedings of a workshop, Emerging Issues for the Second Decade of Line Oriented Flight Training. Miami, July 1989. To be published as NASA report.

Degani, A. S., and Wiener, E. L. Human factors of flight desk checklists: the normal checklist. NASA Contractor Report No. 177549. NASA Ames Research Center, Moffett Field, CA.

IV. FUTURE ACTIVITIES

Work will continue on this project under Ames grant number NCC2-581 (1 January 1990 - 31 December 1990) and is proposed to continue through the end of 1991 (see Gantt chart). During 1990 the statistical analyses on the questionnaire data will be completed, as well as portions of the error analyses from the video tapes. Transcription of the video tapes for communication analysis will be completed, and analyses will begin. 1991 will see the completion of the error and communication analyses, and the publication of the results.

